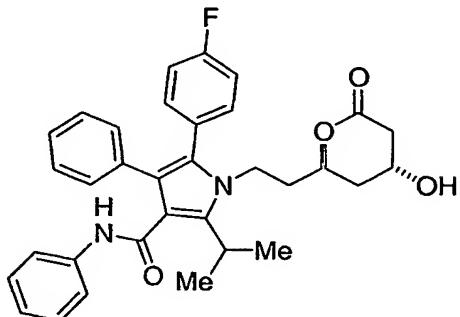


-37-

## **CLAIMS**

1. A process for preparing a compound of formula (I)



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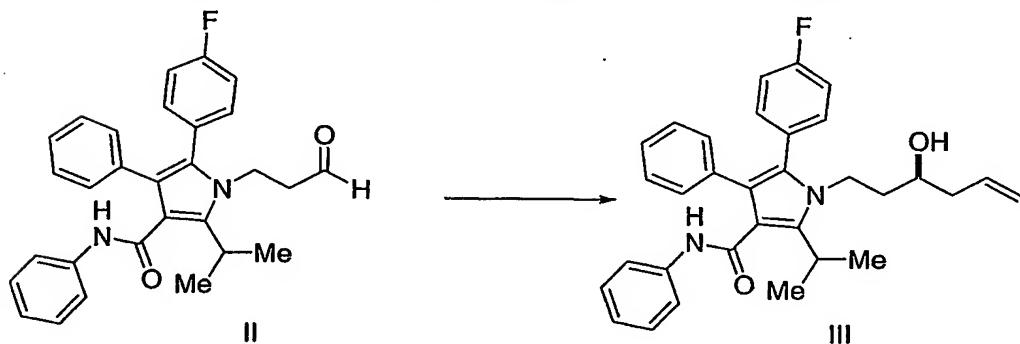
1

comprising:

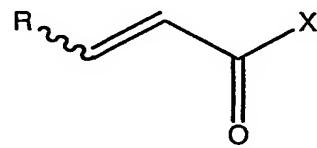
(a) contacting in a solvent optionally in the presence of a Lewis acid a

compound of formula (II) with  , wherein M is  $\text{SiCl}_3$ ,  $\text{SiMe}_3$ ,  $\text{B}(\text{OH})_2$ ,  $\text{CuLi}$ ,  $\text{MgBr}$ ,  $\text{ZnBr}$ ,  $\text{InBr}$ ,  $\text{SnR}_3$  wherein  $\text{R}_3$  is  $(\text{C}_1\text{-C}_6)\text{alkyl}$ , to give a compound of formula (III):

10

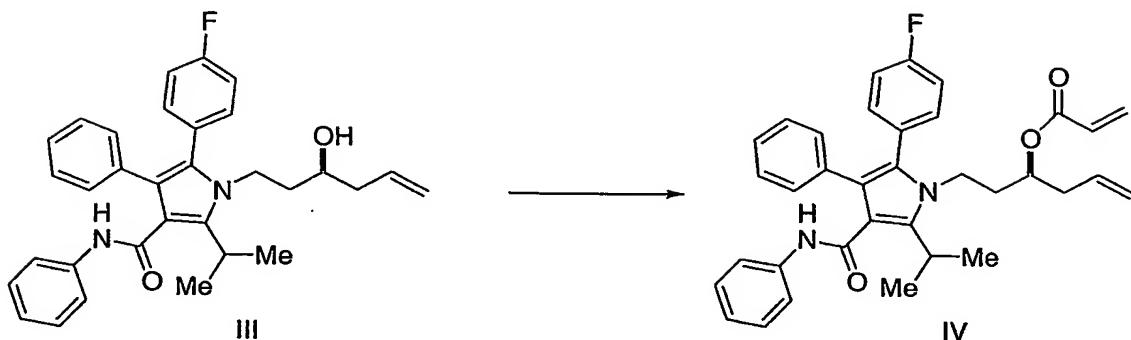
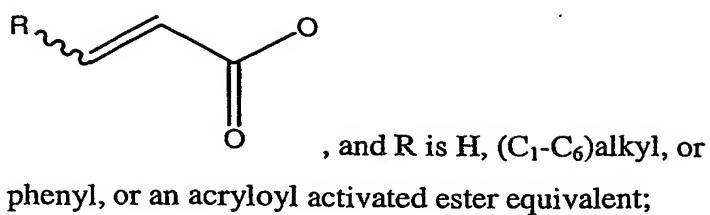


(b) conversion of the compound of formula (III) to an acryloyl ester of formula (IV) in the presence of base using



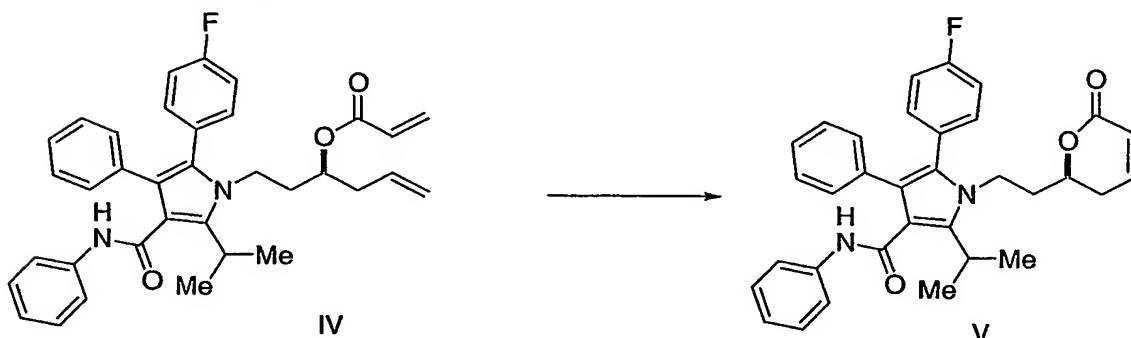
15

-38-



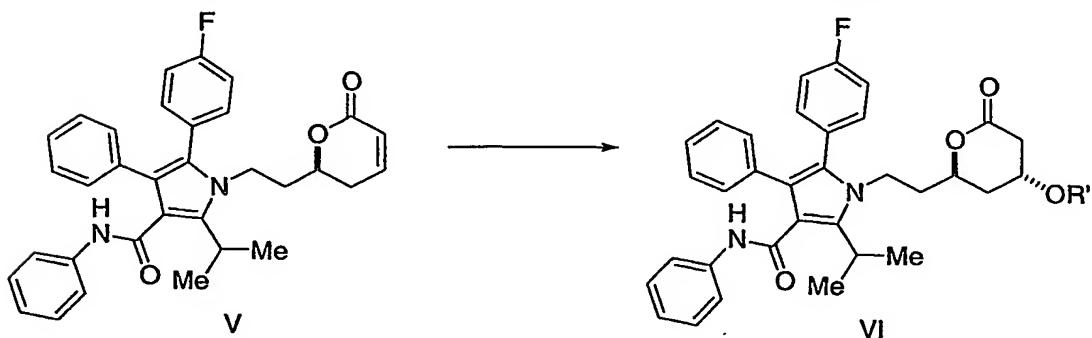
5

(c) contacting in a solvent the acryloyl ester (IV) with a catalyst to afford 5,6 dihydro pyran-2-one V;



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(d) converting the compound of formula (V) to a compound of formula (VI) via facial selective 1,4 addition of allyl or benzyl alcohol;

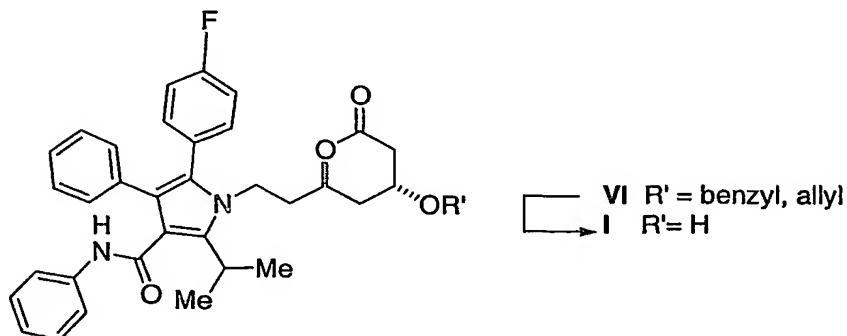


R'= benzyl, allyl

-39-

and

(e) removal of the allyl or benzyl moiety in the compound of formula (VI) via hydrogenolysis to give a compound of formula I.



5

2. The process of step (a) of claim 1, wherein is allyl tri-n-butylstannane, allyl trimethylsilane, allyltrichlorosilane, allyl magnesium bromide, or allyl zinc bromide, optionally used in the presence of an amino alcohol or diamine or a Lewis Base.

10

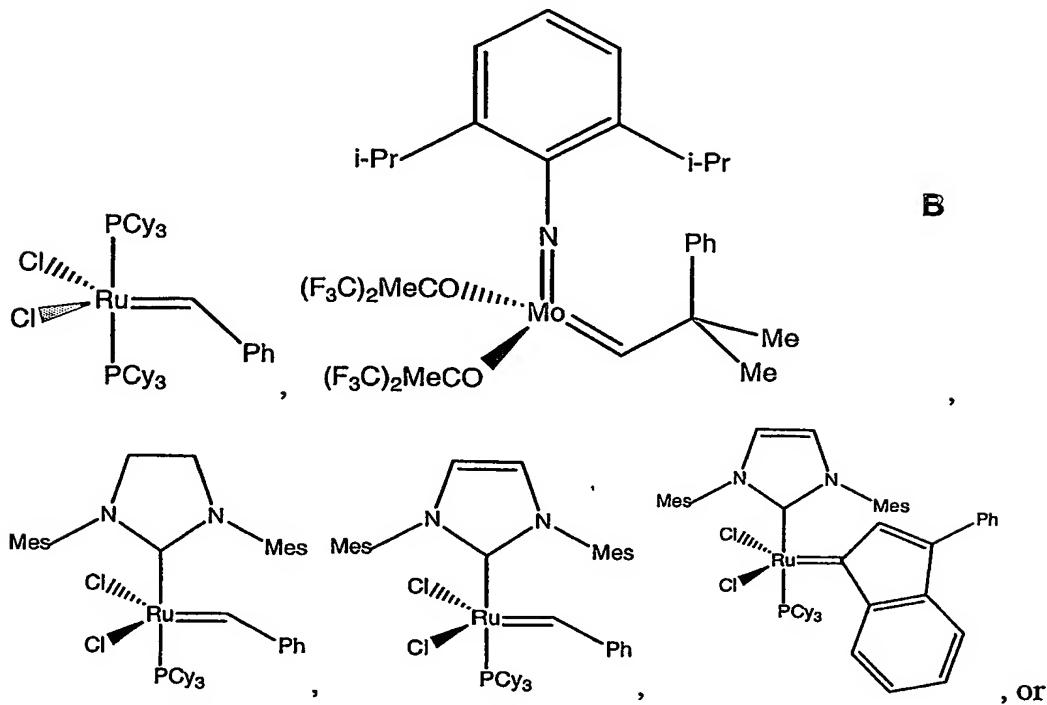
3. The process of step (a) of claim 1 carried out in the presence of a nonchiral or chiral Lewis acid, optionally generated in situ from boron tribromide and (S,S)-1,2-diamino-1,2-diphenylethane *bis*-toluenesulfonamide.

15

4. The process of step (b) of claim 1 wherein the base is an amine base selected from the group consisting of triethyl amine, N,N dimethyl amino pyridine, DBU, and DBN optionally in the presence of a catalytic amount of DMAP and the polar nonprotic solvent is dichloromethane.

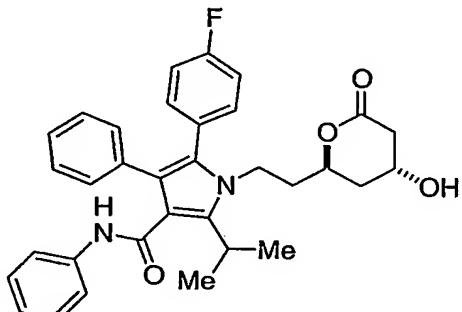
-40-

5. The process of step (c) of claim 1, wherein the catalyst is



benzylidene[1,3-bis(2,4,6-trimethylphenyl)-2-imidazolidinylidene] dichloro  
5 (tricyclohexylphosphine)ruthenium.

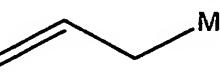
6. A process for the preparation of a compound of formula (I)



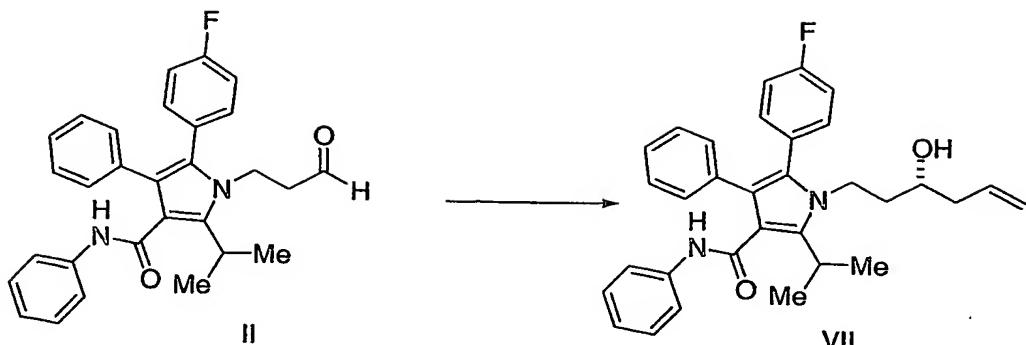
I

10 comprising:

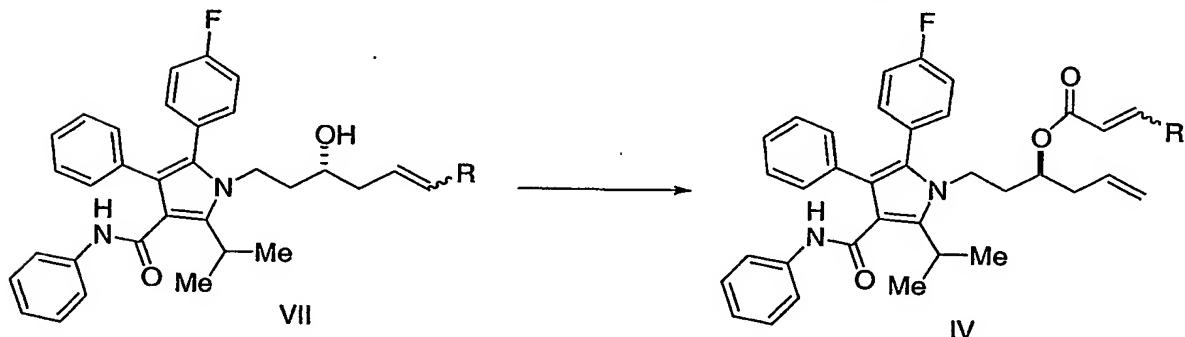
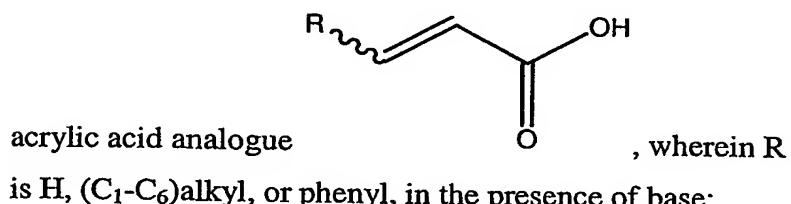
(a) contacting in a solvent optionally in the presence of a Lewis acid a

compound of formula (II) with  , wherein M is  
 $\text{SiCl}_3$ ,  $\text{SiMe}_3$ ,  $\text{B}(\text{OH})_2$ ,  $\text{CuLi}$ ,  $\text{MgBr}$ ,  $\text{ZnBr}$ ,  $\text{InBr}$ ,  $\text{SnR}_3$  wherein  $\text{R}_3$  is  $(\text{C}_1\text{-C}_6)$ alkyl, to give a compound of formula (III):

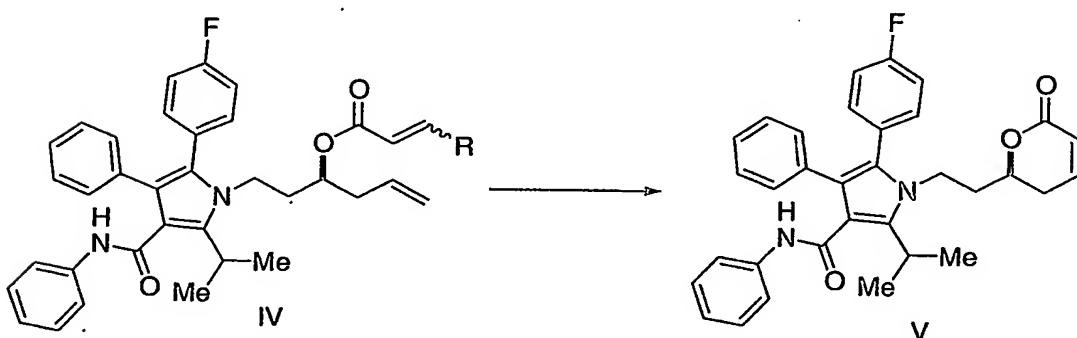
-41-



(b) conversion of the compound of formula (VII) with concomitant stereochemical inversion of the homoallylic alcohol center to an acryloyl ester of formula (IV) via Mitsunobu reaction in the presence of acrylic acid or an

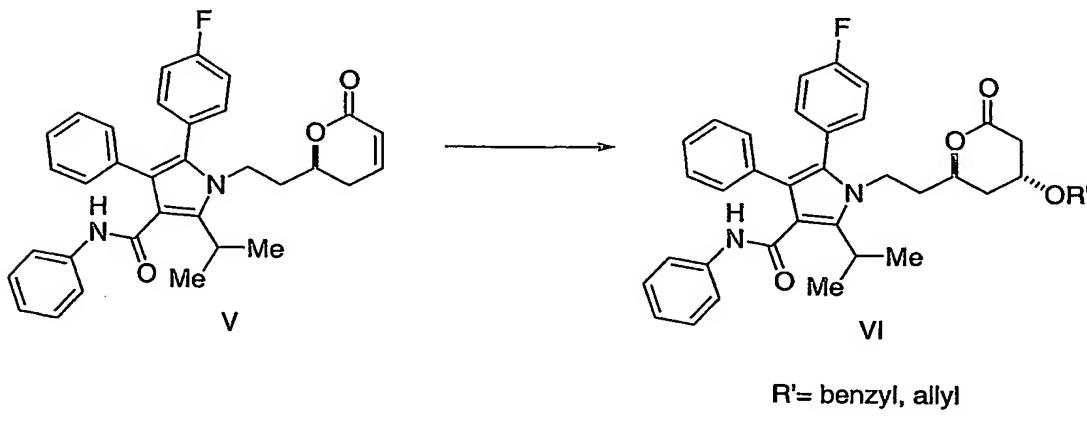


10 (c) contacting in a solvent the acryloyl ester (IV) with a catalyst to afford 5,6 dihydro pyran-2-one V;



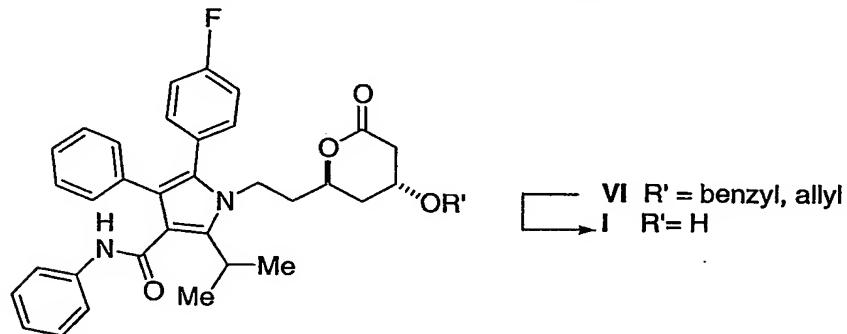
-42-

(d) converting the compound of formula (V) to a compound of formula (VI) via facial selective 1,4 addition of allyl or benzyl alcohol;

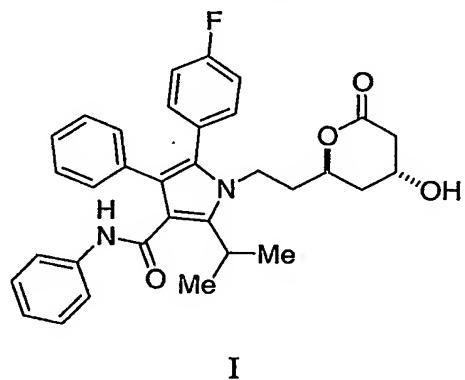


5 and

(e) removal of the allyl or benzyl moiety in the compound of formula (VI) via hydrogenolysis to give a compound of formula I.



10 7. A process for the preparation of a compound of formula (I)

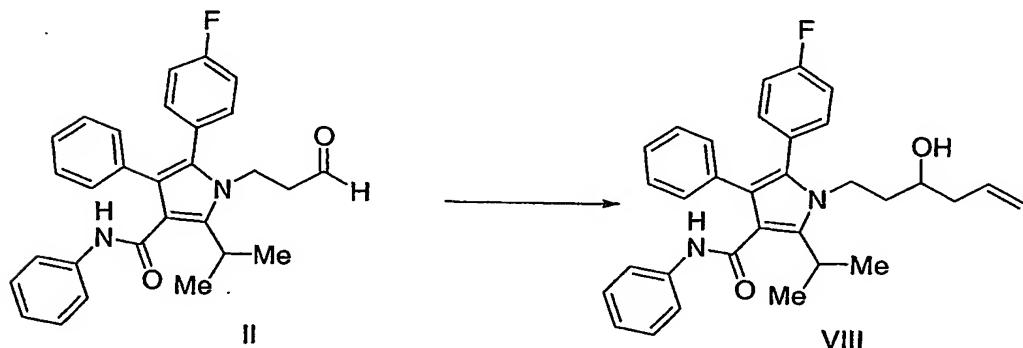


comprising:

-43-

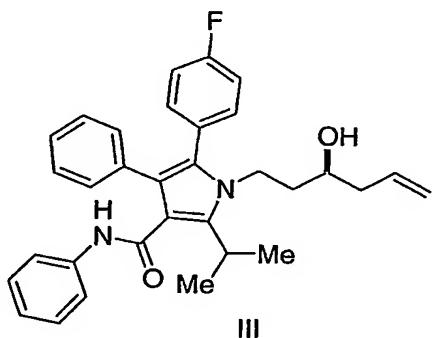
(a) contacting in a solvent optionally in the presence of a Lewis acid a

compound of formula (II) with  , wherein M is  $\text{SiCl}_3$ ,  $\text{SiMe}_3$ ,  $\text{B}(\text{OH})_2$ ,  $\text{CuLi}$ ,  $\text{MgBr}$ ,  $\text{ZnBr}$ ,  $\text{InBr}$ ,  $\text{SnR}_3$  wherein  $\text{R}_3$  is  $(\text{C}_1\text{-C}_6)\text{alkyl}$ , to give a compound of formula (VIII):



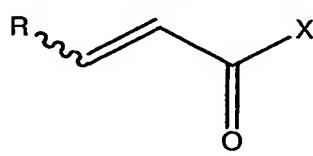
5

(b) isolating the desired enantiomer (VIII) from the enantiomeric mixture;

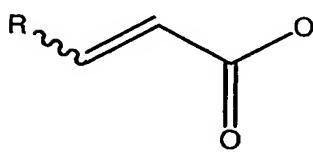


10

(c) conversion of the compound of formula (III) to an acryloyl ester of formula (IV) in the presence of base using



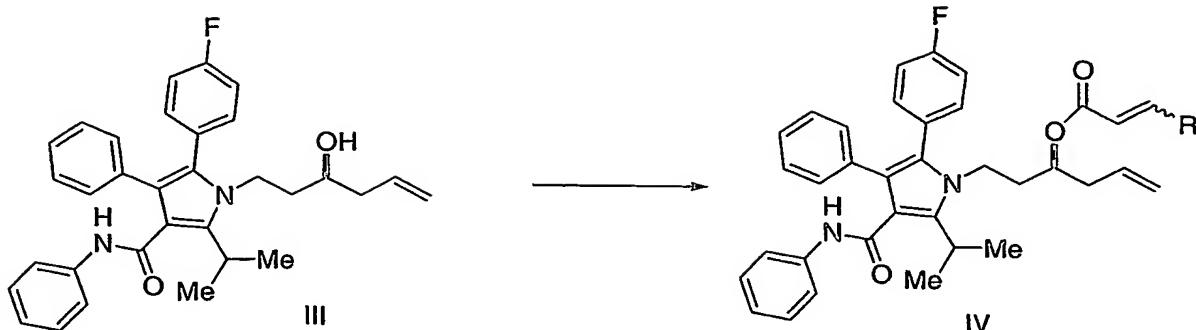
, wherein X is Cl, Br, I, or



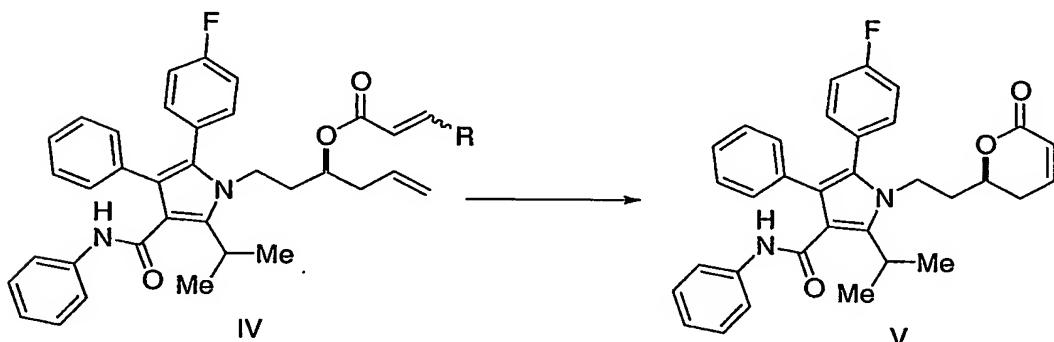
, and R is H, (C<sub>1</sub>-C<sub>6</sub>)alkyl, or

phenyl, or an acryloyl activated ester equivalent:

-44-

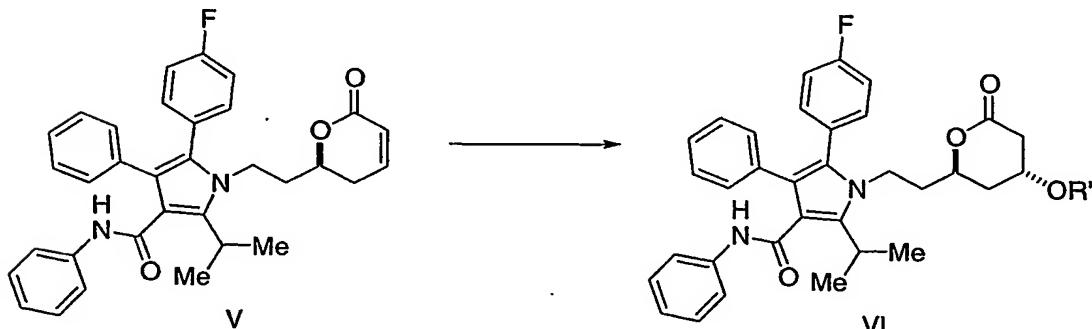


(d) contacting in a solvent the acryloyl ester (IV) with a catalyst to afford 5,6 dihydro pyran-2-one V;



5

(e) converting the compound of formula (V) to a compound of formula (VI) via facial selective 1,4 addition of allyl or benzyl alcohol;



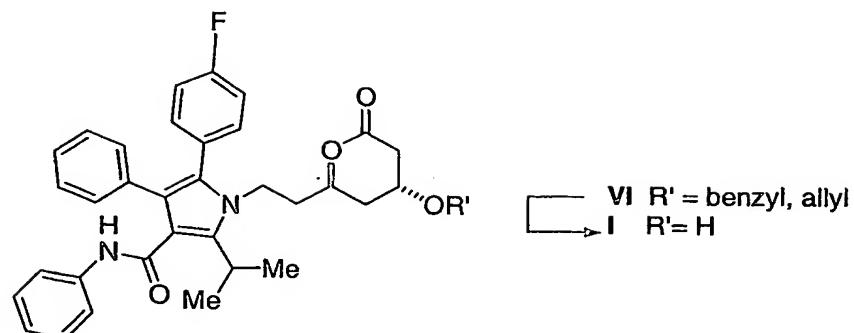
R' = benzyl, allyl

10

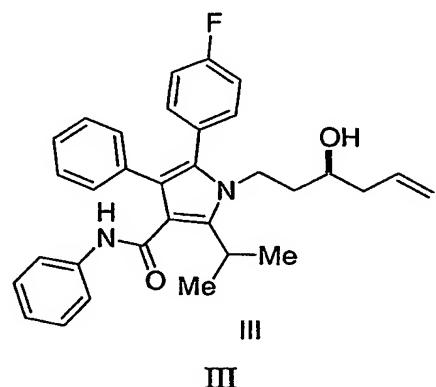
and

(f) removal of the allyl or benzyl moiety in the compound of formula (VI) via hydrogenolysis to give a compound of formula I.

-45-



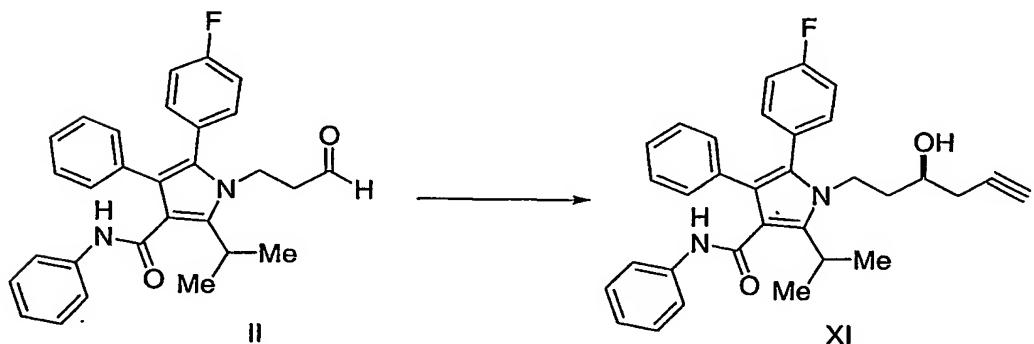
8. A process for the preparation of a compound of formula III



5

comprising:

(a) contacting a compound of formula (II) with an allenylboronic ester to give a compound of formula (XI):

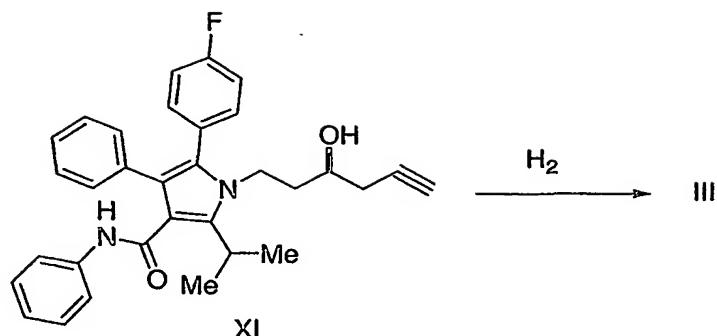


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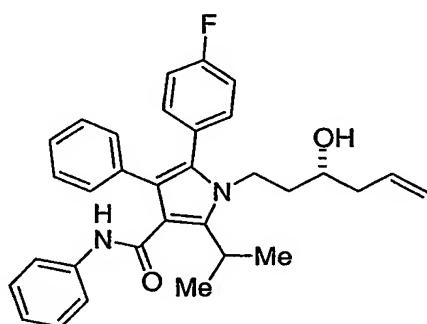
and

(b) hydrogenation of the compound of formula (XI) to provide III

-46-



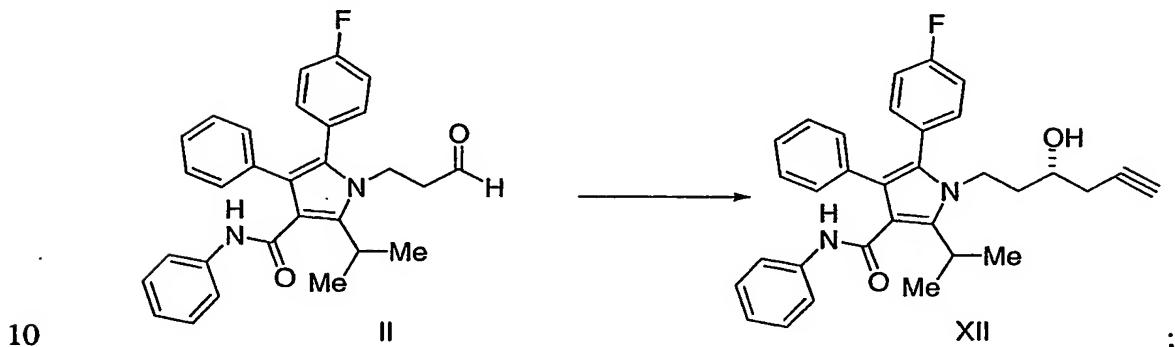
9. A process for the preparation of a compound of formula VII



5

comprising:

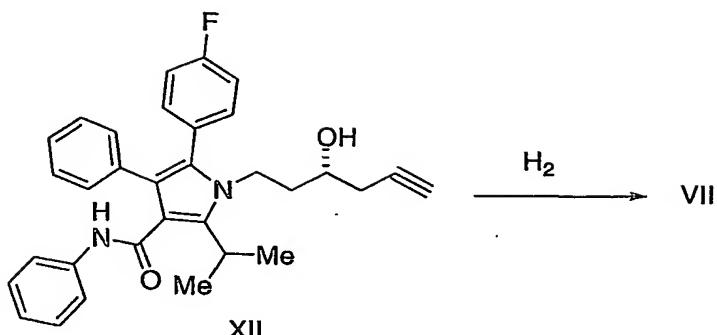
(a) contacting compound (II) with an allenylboronic ester to give a compound of formula (XII):



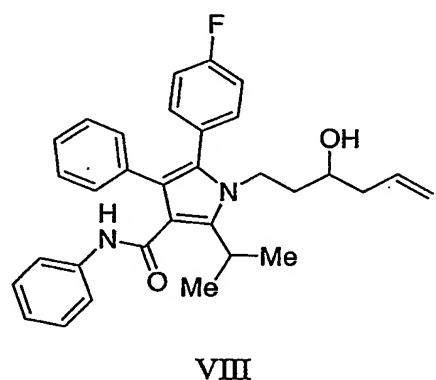
and

(b) hydrogenation of the compound of formula (XII) to provide VII

-47-



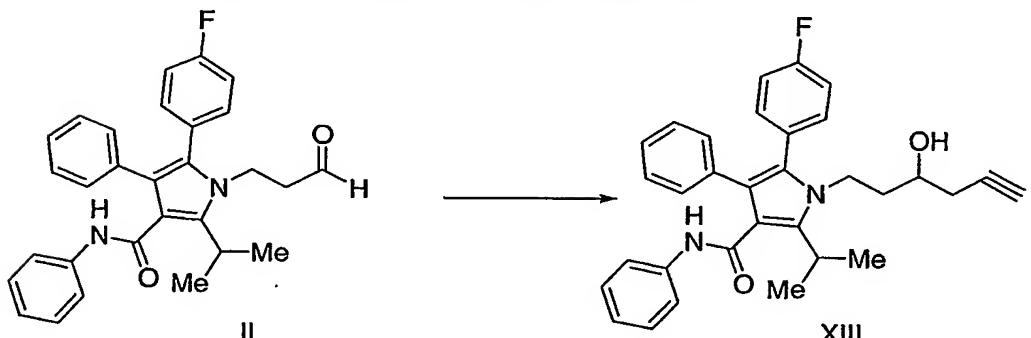
10. A process for the preparation of a compound of formula VIII



5

comprising:

(a) contacting (II) with allenylboronic acid or an allenylboronic ester to give a compound of formula (XIII):

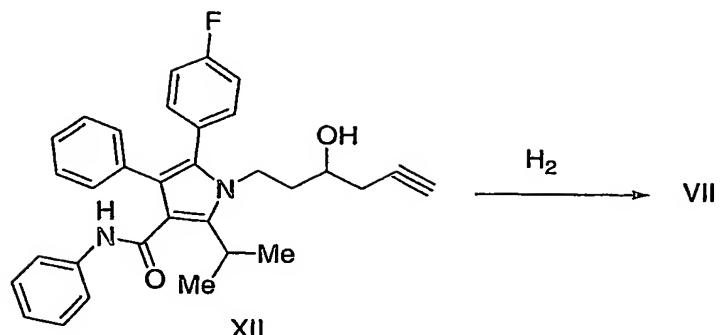


10

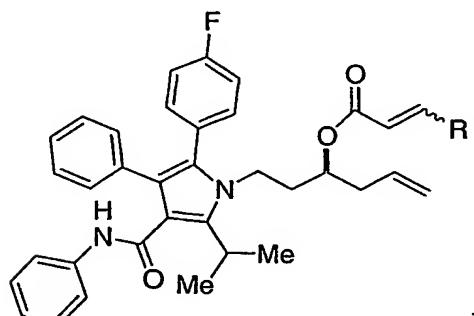
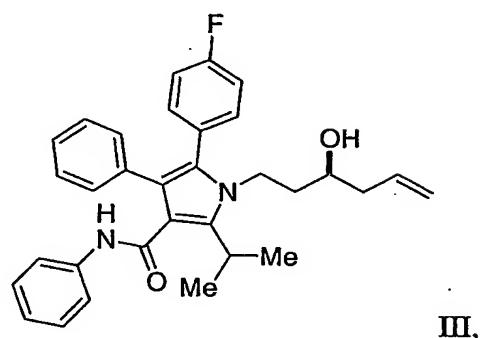
and

(b) hydrogenation of the compound of formula (XII) to provide VII

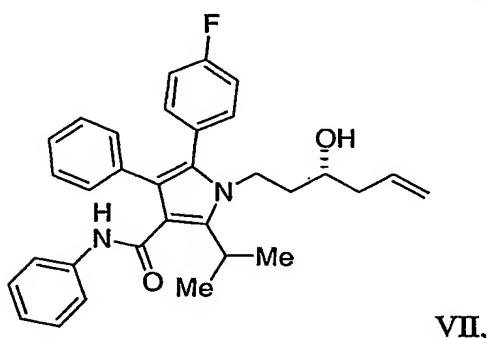
-48-



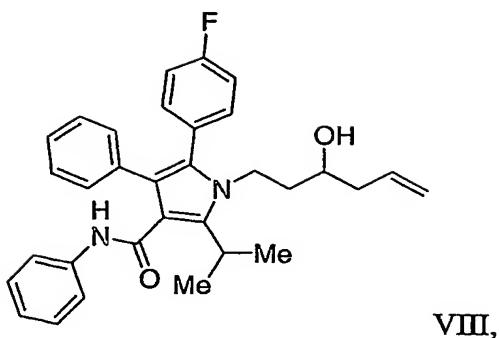
**11. Compounds of the following formulas:**



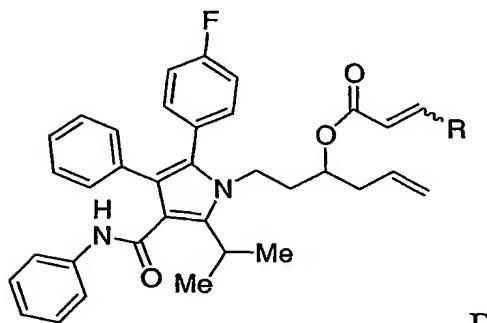
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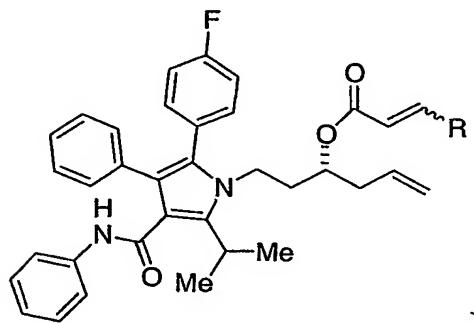
-49-



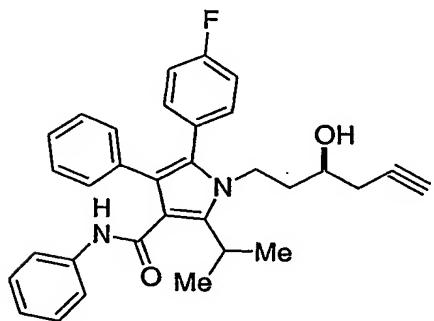
VIII,



IX,

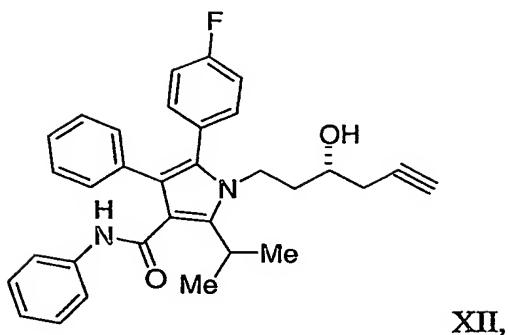


X,

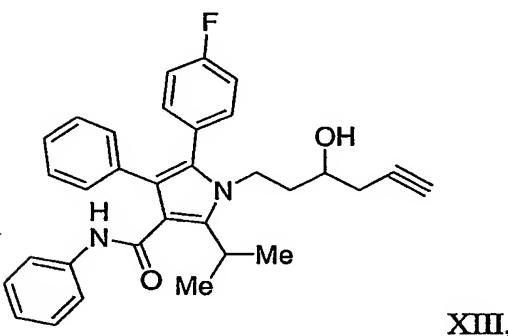


XI

-50-



XII,



XIII,

wherein R is H, (C<sub>1</sub>-C<sub>6</sub>)alkyl, or phenyl.